MCKV Institute of Engineering

243 G. T. Road (N), Liluah, Howrah – 711204

Subject: **Object Oriented Programming Lab** Code:**PC-CS592**
Stream: CSE Credit: 1.5

Assignment: - 09/ *Concept of Inheritance, Abstract class, Interface & Method Overriding*

A. Create a class called Employee which maintains the details of an employee (EID, Name, Basic, City). The class contain the following member function
   i) Takes all the details of Employee.
   ii) Shows the details of an employee
   iii) Find the gross salary of an employee.
   Create two subclasses Company1 and Company2 which inherits the parent class Employee but the salary structure is different than the Employee class. Override the function Salary() according to the company1's and company2's salary structure. Considering salary structure of Company1, AGP is 40% of the basic pay. Company provides 25% DA and 10% HRA on the merged basic (Basic+ AGP). Similarly, Company2 provides AGP 50% of the basic pay. They also provide 50% DA and 15% HRA on the merged basic (Basic+ AGP). Create a main class to instantiate several objects of these classes and implement the above-stated function.

B. Write a program that creates a base class called "Number". This class holds an integer value and contains an abstract method called displayNum(). Create two derived classes called "HexNum" and "OctalNum" that inherit "Number". Override displayNum() in the derived classes so that it displays the value in Hexadecimal and Octal respectively. Write a main() function to create objects of type "HexNum" and "OctalNum" classes and display the hexadecimal and octal form of supplied integer value. (Use base class reference to call a function).

C. Create an abstract base class called called "2Dfigure" that holds two dimensions of a figure. It also declares an abstract function called calculateArea() that when overridden by derived classes returns the area of type 2Dfigure defined by the derived class. Create two derived classes "Rectangle" and "Triangle" that inherit "2Dfigure". Write a main() function to create object of these classes and display the area of rectangle and triangle.(Use base class reference to call a function).

D. Develop an abstract class "GeometricObject" which will have two member variables color and weight. It would have constructor function for setting the color as "White" and weight as "1.0" as default values. The class should have methods getColor() and getWeight() to return the color and weight values to the caller. The class should have two abstract methods findArea() and findCircumference(). Write a subclass for "GeometricObject" called "Triangle" which will able to calculate area and circumference for a triangle.

E. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

F. Write a Java program where multiple inheritance is achieved through interface.

G. Write a Java program in which interface is given by name MeanInterface. Method mean() is defined in this interface that calculates the mean of the given numbers arranged in an array. This interface is then extended and the method is defined in this interface that calculates the deviation from the mean value evaluated for each of the numbers.

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Signatures of the Faculty Members Signatures of HOD (CSE)